05-19-06

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IN THE UNITED STATES PATENT & TRADEMARK OFFICE

Application No.	Filed:	Inventor(s):	Atty. Dkt.:
09/828,519	6 APR 2001	Andrew W. Lo et al.	1869-003A [056225-5003]

Title: DATA PROCESSOR FOR IMPLEMENTING FORECASTING ALGORITHMS

Examiner: Felten, Daniel S.	Art Unit: 3624

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

RE-SUBMISSION OF APPEAL BRIEF LOST BY PATENT OFFICE

Sir:

Pursuant to a telephone conversation of Applicant's below-listed representative with

Examiner James Alpert on May 16, 2006, in which Examiner Alpert stated that the Patent Office

has no record of receiving the enclosed Appeal Brief, the Brief is respectfully re-submitted, along

with a stamped return receipt postcard showing that the Brief was received by the Patent Office and

accorded a submission date of September 20, 2005.

THE FEE FOR FILING THIS APPEAL BRIEF HAS ALREADY BEEN CHARGED AND

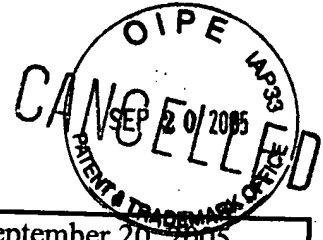PAID. PLEASE DO NOT CHARGE US AGAIN FOR THIS RE-SUBMISSION.

Respectfully submitted,

Dated: May 17, 2006

Steven D. Underwood, Esq.
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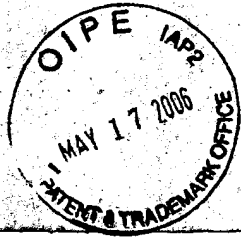
ATTENTION: MAIL STOP <u>APPEAL BRIEF-PATENTS</u>
PLEASE STAMP AND RETURN TO SHOW RECEIPT OF:

Express Mail No.	**EV 797 296 733 US**	Date Mailed:	September 20, 2005
Serial No.	09/828,519		
Inventor:	FELTEN, Daniel S.	Filed	April 6, 2001
Entitled:	**DATA PROCESSOR FOR IMPLEMENTING FORECASTING ALGORITHMS**		

Enclosed:

1. Petition for Three-Month Extension of Time to File Appeal Brief (in duplicate)

2. Appeal Brief (Pursuant to 37 C.F.R. 1.192) (with exhibit)

3. Return postcard

Attorney: Steven D. Underwood/15115   Docket No.   056225-5003-01 US

IN THE UNITED STATES PATENT & TRADEMARK OFFICE

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Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

PETITION FOR THREE-MONTH EXTENSION OF TIME TO FILE APPEAL BRIEF

Sir:

Applicant hereby petitions for a three-month extension of time to file the enclosed Appeal Brief due June 20, 2005, thus extending the due date for filing the enclosed Appeal Brief from June 20, 2005 to September 20, 2005. The fee for this extension is estimated to be $1020. Please charge the required fee to Deposit Account No. 50-0310.

Respectfully submitted,

Date: __September 20, 2005__

Steven D. Underwood, Esq.
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IN THE UNITED STATES PATENT & TRADEMARK OFFICE

Application No.	Filed:	Inventor(s):	Atty. Dkt.:
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Examiner: Felten, Daniel S.	Art Unit: 3624

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

APPEAL BRIEF (PURSUANT TO 37 C.F.R. 1.192)

Sir:

(1)   Real Party In Interest

The real party in interest is the Massachusetts Institute of Technology of Cambridge,

Massachusetts.

(2)   Related Appeals and Interferences

There are no other prior or pending appeals, interferences, or judicial proceedings known

to appellant, appellant's legal representatives, or assignee that may be related to, directly affect,

or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3)   Status of Claims

One claim was filed with the application; claims 2-14 subsequently were added. Claims

11-14 were withdrawn in response to a restriction requirement. Claims 1-10 are pending and

stand rejected. The rejections of claims 1-10 are being appealed.

(4) Status of Amendments

No amendments were filed after the final rejection and before this Appeal Brief.

(5) Summary of the Invention Defined in the Claims

The present invention comprises a system and method for implementing forecasting algorithms. Claim 1 is directed to a system for pattern recognition in price data. The system comprises: (a) a database for storing price data in system addressable format; (b) a data processor for generating a non-linear relationship having a smooth, curvilinear characteristic for a range of data within the selected interval; (c) a pattern recognition processor for applying said smoothed non-linear relationship to discern the existence of one or more patterns of price-time data; and generating a results output based on a recognition of said pattern, if any.

Note that the original claims form part of the disclosure, and that claim 1 is essentially as filed (the claim has been amended only to correct a spelling error). However, as discussed below, additional support may be found in the specification.

Specifically, claim 1 comprises: a database means for storing said price data in system addressable format, wherein said price data is organized for processing into a non-linear relationship (page 15, lines 14-15);

a data processor responsive to price data stored in said database and capable of generating said non-linear relationship having a smooth, curvilinear characteristic for a range of data within said interval (page 5, lines 15-18);

a pattern recognition processor for applying said smoothed non-linear relationship to discern the existence of one or more patterns of price-time data; and generating a results output based on a recognition of said pattern, if any (page 6, lines 20-23)

Claim 2 is to the system of claim 1 wherein real-time price data is inputted from commercial financial data vendors (page 6, lines 9-12).

Claim 3 is to the system of claim 1 wherein said database means includes means for storing price data taken from end of day trading records (page 15, lines 21-23).

Claim 4 is to the system of claim 1 wherein said database means includes means for storing trading volume and trade size data (page 6, lines 9-10).

Claim 5 is to the system of claim 1 further comprising means for testing prediction characteristics, via convergence criteria and adjusting system parameters in response to said criteria (page 7, lines 19-21).

Claim 6 has been re-written to be in independent form, but is to a system as in claim 1, further comprising programming to detect one or more broadening tops and broadening bottoms. (page 11, lines 10-15).

Claim 7 has been re-written to be in independent form, but is to a system as in claim 1, further comprising programming to detect one or more head and shoulders patterns. (page 11, lines 10-15).

Claim 8 has been re-written to be in independent form, but is to a system as in claim 1, further comprising programming to detect one or more triangle tops and triangle bottoms. (page 11, lines 10-15).

Claim 9 has been re-written to be in independent form, but is to a system as in claim 1, further comprising programming to detect one or more rectangle tops and rectangle bottoms. (page 11, lines 10-15).

Claim 10 has been re-written to be in independent form, but is to a system as in claim 1, further comprising programming to detect one or more double tops and double bottoms. (page 11, lines 10-15).

(6)   Issue

Whether claims 1-10 are unpatentable under 35 U.S.C. § 103 over U.S. Pat. No. 6,012,042, to Black et al. in view of U.S. Pat. No. 5,444,819, to Negishi and further in view of Castiglione, F., "Forecasting price increments using an artificial Neural Network."

(7)   Grouping of Claims

Although it is not conceded that the claims on appeal are not separately patentable, for this appeal the claims may stand or fall together. Claim 1 is the representative claim.

(8)   Argument

The Final Office Action ("Office Action") being appealed provides insufficient support for rejecting claim 1, for example, over the combination of Black, Negishi, and Castiglione.

The subject application has a priority date of April 7, 2000. The article by Castiglione, as far as Applicants have been able to determine, was published in March 2001 (see attached Exhibit). However, even if Castiglione was published in 2000, that doesn't necessarily make it prior art. To be prior art, it would need to be published before April 7, 2000. Even though this was first pointed out to the Patent Office in a response mailed July 19, 2004, and has since been reiterated several times, both in writing and in direct telephone conversations with the Examiner, the Patent Office still has not provided any evidence to show that Castiglione is prior art. As a

consequence, the § 103 rejections of claims 1-10, all of which are based on Castiglione, should be withdrawn.[1]

Further, the Office Action fails to provide sufficient justification for combining the three cited references. In response to Applicants' previous arguments that no proper motivation to combine the references was provided, the Office Action states (see page 3):

> In response to Applicant's argument that there is not suggestion to combine references, the examiner recognizes references cannot be arbitrarily combined and that there must be some reason why one skilled in the art would be motivated to make the proposed combination of primary references and secondary references [citation omitted]. However, there is no requirement that the motivation to make the modification be expressly articulated. The test for combining references is the combination of disclosures taken as a whole would suggest to one of ordinary skill in the art [see in re McLaughlin 170 USPQ 209 (CCPA 1971)].

The above statement ignores the other criteria for establishing a *prima facie* case of obviousness (see MPEP § 2143), and does not explain how taking the cited references as a whole provides a motivation to combine them.

In the previously mailed office action (mailed April 20, 2004), the Examiner argued:

> [B]ecause Black includes within the invention's process the technical analysis of price data, it would have been obvious for an artisan of ordinary skill in the art at the time of the invention of Black[2] to integrate/substitute the pattern recognition processor as well as the curve fitting technique disclosed within Negishi and Castiglione, as alternatives to Black's price data analysis because an artisan at the time of the invention of Black would have been motivated to use

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[1]   Applicants reserve the right to substantively address the Castiglione reference (or to swear behind it) if the Patent Office provides evidence that Castiglione was published early enough to qualify as prior art.

[2]   Although a minor point, Applicants respectfully note that the test for obviousness relates to the time of Applicants' invention – not Black's invention. See, e.g., MPEP § 2141.01 (III).

these (and various other) well known techniques to effectively analyze market price data and find new market trends..

The assertions quoted above are incorrect. The asserted "motivations" for combining Black with the combination of Negishi and Castiglione are not supported by the prior art. None of the references suggests that Black would be improved by substituting the teachings of Negishi or the teachings of Castiglione (either separately or in combination) for Black's "price data analysis." Indeed, it is not clear that combining Black with a combination of Negishi and Castiglione would even result in an *operable* system or method, much less an *optimal* system or method. A proposed combination "cannot change the principle of operation of the primary reference or render the reference inoperable for its intended purpose." See MPEP § 2143.01.
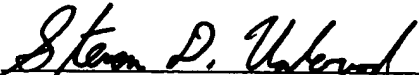
The Office Action language quoted above is not sufficient to establish a *prima facie* case of obviousness. The alleged suggestion or motivation to combine Black with a combination of Negishi and Castiglione must be based on objective evidence in the record. See MPEP 2143.01 and *In re Lee*, cited therein (277 F.3d 1338, 1344-45, Fed. Cir. 2002)).

For at least the above reasons, the § 103 rejection of claim 1 over the combination of Black, Negishi, and Castiglione is improper and should be withdrawn. For at least the same reasons, the § 103 rejections of claims 2-10, all of which (explicitly or implicitly) depend from claim 1, are improper and should be withdrawn. It is therefore respectfully requested that the Board of Patent Appeals and Interferences reverse the rejection of these claims.

The fee for filing this Appeal Brief is estimated to be $500. Please charge all required fees to Deposit Account No. 50-0310.

Respectfully submitted,

Dated: September 20, 2005

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(9) APPENDIX: CLAIMS ON APPEAL

1.   (Previously presented)   A system for processing price data corresponding to a sequence of time for a selected interval, said system comprising:

a database means for storing said price data in system addressable format, wherein said price data is organized for processing into a non-linear relationship;

a data processor responsive to price data stored in said database and capable of generating said non-linear relationship having a smooth, curvilinear characteristic for a range of data within said interval;

a pattern recognition processor for applying said smoothed non-linear relationship to discern the existence of one or more patterns of price-time data; and

generating a results output based on a recognition of said pattern, if any.

2.   The system of claim 1 wherein real-time price data is inputted from commercial financial data vendors.

3.   The system of claim 1 wherein said database means includes means for storing price data taken from end of day trading records.

4.   The system of claim 1 wherein said database means includes means for storing trading volume and trade size data.

5.   The system of claim 1 further comprising means for testing prediction characteristics, via convergence criteria and adjusting system parameters in response to said criteria.

6.   A system for processing price data corresponding to a sequence of time for a selected interval, said system comprising:

a database means for storing said price data in system addressable format, wherein said price data is organized for processing into a non-linear relationship;

a data processor responsive to price data stored in said database and capable of generating said non-linear relationship having a smooth, curvilinear characteristic for a range of data within said interval;

a pattern recognition processor for applying said smoothed non-linear relationship to discern the existence of one or more patterns of price-time data and generating a results output based on a recognition of said pattern, if any; and

programming to detect one or more broadening tops and broadening bottoms.

7.   A system for processing price data corresponding to a sequence of time for a selected interval, said system comprising:

a database means for storing said price data in system addressable format, wherein said price data is organized for processing into a non-linear relationship;

a data processor responsive to price data stored in said database and capable of generating said non-linear relationship having a smooth, curvilinear characteristic for a range of data within said interval;

a pattern recognition processor for applying said smoothed non-linear relationship to discern the existence of one or more patterns of price-time data and generating a results output based on a recognition of said pattern, if any; and

programming to detect one or more head and shoulders patterns.

8.   A system for processing price data corresponding to a sequence of time for a selected interval, said system comprising:

a database means for storing said price data in system addressable format, wherein said price data is organized for processing into a non-linear relationship;

a data processor responsive to price data stored in said database and capable of generating said non-linear relationship having a smooth, curvilinear characteristic for a range of data within said interval;

a pattern recognition processor for applying said smoothed non-linear relationship to discern the existence of one or more patterns of price-time data and generating a results output based on a recognition of said pattern, if any; and

programming to detect one or more triangle tops and triangle bottoms.

9.   A system for processing price data corresponding to a sequence of time for a selected interval, said system comprising:

a database means for storing said price data in system addressable format, wherein said price data is organized for processing into a non-linear relationship;

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a data processor responsive to price data stored in said database and capable of generating said non-linear relationship having a smooth, curvilinear characteristic for a range of data within said interval;

a pattern recognition processor for applying said smoothed non-linear relationship to discern the existence of one or more patterns of price-time data and generating a results output based on a recognition of said pattern, if any; and

programming to detect one or more rectangle tops and rectangle bottoms.

10.   A system for processing price data corresponding to a sequence of time for a selected interval, said system comprising:

a database means for storing said price data in system addressable format, wherein said price data is organized for processing into a non-linear relationship;

a data processor responsive to price data stored in said database and capable of generating said non-linear relationship having a smooth, curvilinear characteristic for a range of data within said interval;

a pattern recognition processor for applying said smoothed non-linear relationship to discern the existence of one or more patterns of price-time data and generating a results output based on a recognition of said pattern, if any; and

programming to detect one or more double tops and double bottoms.

EXHIBIT

09/828,519

ADVANCES IN COMPLEX SYSTEMS

Vol. 4, No. 1 (March 2001)

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FORECASTING PRICE INCREMENTS USING AN ARTIFICIAL NEURAL NETWORK

FILIPPO CASTIGLIONE

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Financial forecasting is a difficult task due to the intrinsic complexity of the financial system. A simplified approach in forecasting is given by "black box" methods like neural networks that assume little about the structure of the economy. In the present paper we relate our experience using neural nets as financial time series forecast method. In particular we show that a neural net able to forecast the sign of the price increments with a success rate slightly above 50% *can* be found. Target series are the daily closing price of different assets and indexes during the period from about January 1990 to February 2000.

Keywords: Forecasting, neural networks, financial time series, detrending analysis.

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